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C^2 IN THE INFORMATION AGE:

WILL OPERATIONAL COMMAND ECHELONS BECOME UNNECESSARY?

by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the
requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily
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Abstract of

C² IN THE INFORMATION AGE:

WILL OPERATIONAL COMMAND ECHELONS BECOME UNNECESSARY?

Command and control (C²) is at the very heart of on-going debates over the future. This is understandable, and quite necessary, given the emphasis *Joint Vision 2010* places on information superiority. The current wide-ranging dialogue has thus far brought a number of compelling issues to the fore. Amid discussions of the "way forward," Network-Centric Warfare advocates have suggested that intermediate command echelons will impede future C² processes and should therefore be eliminated.

Current discussions of the benefits of a networked system are decidedly oriented toward the tactical level where the emphasis is on action and rapid decision-making. This does not do justice to the responsibilities of an operational commander. Nevertheless, efforts to explore Network-Centric Warfare's potential applications beyond the tactical level may soon prompt decision-makers to consider flattening the U.S. C² structure by removing operational command echelons. Focusing on issues related to **organizational balance** and **command style**, this analysis suggests that this option is untenable. Given the increased complexity of warfare, wide range of potential missions, and greater likelihood of operating in joint and combined environments, operational C² will remain just as critical to the successful conduct of major operations and campaigns as it has in the past. Any decision about how to alter the U.S. military C² structure should thus make preserving operational command echelons a requisite goal.

PREFACE

This paper highlights the gap that can develop between operational reality and visions of the future by examining an area that needs to be shaped by more vigorous, *deliberate* debate—technology's impact on the operational function of command and control (C^2). Without fully identifying potential consequences for the U.S. military C^2 structure, Network-Centric Warfare advocates have proposed that a major benefit of emerging technology is the ability to eliminate intermediate command echelons. Because this concept of "flattening" command structures is being explored separately within the service and joint arenas, its broader utility remains to be seen.

My overarching goal is to identify the need for a critical, systematic analysis regarding network-based adaptations to the U.S. military C^2 structure. As such, I have concentrated on those conceptual issues that I feel need to be sorted out first. This includes the relevance of the levels of war to an information age military, the importance of organizational balance within the U.S. military C^2 structure, and ongoing discussions relating to centralized control and decentralized execution. Because I am seeking to make broader points, my examination touches only briefly on the role of the operational command echelon in planning, training, and integrating operational functions. These areas will deserve more attention before making any substantive organizational adaptations to the C^2 structure. Likewise, the difficulties of interoperability—particularly integrating with less technologically advanced coalition forces—and the cultural implications inherent in organizational changes are not covered here but are worthy of detailed exploration.

INTRODUCTION

There is little doubt that the U.S. military will be fundamentally altered in the 21st Century, but the as-yet-unanswered question is...*how?* Various interpretations of the victory in the Gulf War, combined with stunning advances in information systems, have created a strong impetus to realize a Revolution in Military Affairs (RMA). Information technology's steadily increasing impact on warfighting cannot be questioned. While systems that were used to transmit messages during the Gulf War could handle 2400 bits of information per second, the Global Broadcast System transmitted 23 *million* bits per second to forces in Bosnia.[1] The belief that U.S. military forces must adapt to take advantage of these information systems is the defining characteristic of this particular RMA. This is readily apparent in *Joint Vision 2010's* emphasis on establishing information superiority as a prerequisite for success on future battlefields.[2]

The collective desire to leverage new systems has opened a wellspring of joint and service-specific information warfare initiatives. The lack of consensus over the "way forward" is striking, but for the most part these programs can be divided into two broad categories. First, there are those that seek incremental change—such as the Army's "Digital Battlefield" and the Department of Defense's "Advanced Battlefield Information System." Other programs—such as the "Army-After-Next," the Marine Corps' "Sea Dragon" concept, the Air Force's "New World Vistas," and the Navy's "Forward From the Sea"—seek more radical change.[3]

Amid these numerous and wide-ranging discussions, proponents of Network-Centric Warfare have suggested that in order to succeed in the so-called "information age," U.S. military forces must adapt according to a business-based "flat" organizational

model.[4] Using such factors as *speed of command* and *increased access to information* as relative measures of effectiveness, the implication is that the traditional hierarchical organization and associated command style will not keep pace with anticipated increases in the tempo of future warfare.[5] This proposal is at once enticing and daunting. It offers the promise of streamlining a structure that is often criticized for its tendency toward bureaucracy; yet, the very notion that intermediate command echelons should be eliminated raises a host of command and control (C^2) related organizational issues that must be considered. The crux of the dilemma is that while these business-related concepts are admittedly intriguing, their actual utility in the military context remains to be seen. Moreover, determining their usefulness calls for critical analysis within a framework of active debate designed to identify benefits as well as potential pitfalls.

Development of any future military organizational orientation will need to be based on a full understanding of what takes place across the levels of war. Current discussions of the benefits of a networked system are decidedly oriented toward the tactical level where the emphasis is on action and rapid decision-making. This does not do justice to the responsibilities of an operational commander. Even more disconcerting, the desire to export network-based organizational concepts beyond the tactical level may one-day prompt decision-makers to consider flattening the U.S. military C^2 structure by removing operational level echelons altogether. After all, technology will support doing so, and senior leaders have already displayed a tendency to sidestep these echelons. However, this option is untenable. Any attempt to streamline the U.S. military C^2 structure should not be made at the expense of operational command echelons. Preserving these intermediate echelons is vital to maintaining the **organizational balance**

and **flexible command style** necessary to deal with the complexity of future challenges. Both of these organizational issues will be discussed in further detail, but first it is necessary to examine the growing debate about technology's impact on the levels of war. This is emerging as a backdrop against which critical decisions about U.S. military C^2 will be made.

THE LEVELS OF WAR AS AN ENDURING FRAMEWORK

As with any RMA, this one is characterized by the need to reconcile elements of change with threads of continuity.[6] The very idea that a hierarchical orientation has inherently negative connotations runs counter to the well-established principle of using the levels of war to provide a framework for delineating responsibilities. A question that must therefore be resolved as quickly as possible is whether the levels of war are relevant for an information age military. Some might argue that they are not. The use of deep strike precision and stealth assets to simultaneously attack strategic, operational and tactical targets in Iraq during the Gulf War has led to speculation that the boundaries separating these levels have become blurred, and that perhaps the distinction will disappear completely.[7] However, this reflects an incomplete understanding of the purpose of these broad categories. The levels of war are more than a means to determine how best to attack an adversary. They serve as a framework to instill structure to one's own command relationships, reflecting the recognition that war, by nature, is a complex endeavor. Success requires on-going coordination throughout a continuum that encompasses high level policymakers at one end, and tactical level actors at the other. The pivotal position in this relationship is the intermediate, operational, level.[8]

In general terms, the focus at the operational level is on conducting joint operations in accordance with national and theater strategic guidance. In U.S. military practice, documents such as the *National Security Strategy*, *National Military Strategy* and *Joint Strategic Capabilities Plan* (JSCP) enable combatant commanders to develop theater-specific strategies and campaign plans. This peacetime planning forms the basis for wartime force employment.[9] The operational commander's core task is to translate strategic objectives and guidance into a coherent framework, then to orchestrate tactical actions that achieve these objectives. [10] The vital importance of this coherence is underscored by the American experience in Vietnam, a stark reminder that tactical victories that do not fit into an overarching operational or strategic framework are irrelevant.

Eliminating operational echelons would have profound repercussions for U.S. military force employment. In addition to sequencing and synchronizing joint forces in combat, the operational commander oversees the integration of several critical operational functions—namely intelligence, fires, logistics, and protection.[11] He and his staff must address sustainment issues, to include coordinating host-nation support, and ensuring the development of supporting infrastructure. Depending upon the situation, he is also likely to interact with coalition leaders and representatives from various international and non-governmental organizations. He must consider the application of all available instruments of power—military, economic, political and informational— within his area of operations. Perhaps most importantly, he must anticipate war termination issues, making sure the necessary plans and resources are available for transition to the post-conflict phase. Each of these responsibilities, as well as several not

mentioned here, require the operational commander to constantly assess the contours of circumstances as they unfold, to make time-critical decisions, and to provide advice to national and theater-strategic commanders regarding various courses of action and their potential ramifications.

Rather than a reason to eliminate operational command echelons, the predicted blurring of boundaries between the levels of war will increase the need for operational C^2. Operational commanders will not only need to cope with the faster tempo of activity in future wars; they will need to determine how to influence strategy using simultaneous strategic and tactical events.[12] This in itself will increase the complexity of operational warfare. Given this increased complexity, the wide range of potential missions, and the greater likelihood of operating in joint and combined environments, operational C^2 will remain just as critical to the successful conduct of major operations and campaigns as it has been in the past. Any decision about how to alter the U.S. military command structure should thus make preserving the viability of operational command echelons a requisite goal. Moreover, evaluation of potential network-based adaptations needs to account for the operational commander's role.

In sum, the levels of war are an enduring framework that, if permitted to do so, can assist U.S. military forces in coping with dramatic change by providing a clear delineation of responsibilities. Discussions of their "imminent collapse" should therefore be kept in perspective. Rather than an indication that these levels will cease to exist, the predicted blurring of boundaries is merely a reflection of the increasingly dynamic nature of warfare. This very complexity argues that U.S. forces should continue to use the levels of war to structure their approach to warfare. This said, a number of organizational

considerations not only reinforce the need to retain operational level C^2, but indicate that care should be taken in determining the feasibility of eliminating elements from *within* that level's structure.

ORGANIZATIONAL BALANCE

Armed with a basic understanding of the operational commander's role, one can begin to consider potential changes in the U.S. military C^2 organization. As previously indicated, the generic notion that intermediate layers need to be eliminated is not enough to determine whether or how to change the U.S. military command structure. Carried to the extreme, this could imply that all intervening layers between the National Command Authorities (NCA) and tactical level actors should be removed. While it is possible that such a flat structure might be sufficient during a very specific, limited duration contingency, the wide range of responsibilities described above makes this extreme option militarily unsound. Some sort of hierarchy will be needed to allow U.S. forces to perform the full range of military operations. Beyond this, the key elements that should factor into decisions about future command organization and structure include span of control, burden sharing, on-scene command presence, and unity of effort.

Span of control, the number of units or functions that can be effectively supervised by a single individual, will arguably be one of the most crucial considerations in determining the viability of any proposed network-based system. There is a direct relationship between span of control and the number of intermediate levels within an organization. In general terms, a sound organization has balance, a structure providing for both vertical and horizontal information flow. If the organization has too many

intervening levels it risks having a slow, cumbersome coordination process. Information

is filtered through each level and may lose utility by the time it reaches those who need it.

On the other hand, an organization with too many units under a single supervisor may

also be inefficient. Adding new subordinates requires the supervisor to accommodate

more complex relationships within the organizational structure. While the number of

subordinates directly supervised increases *arithmetically*, the number of cross-

relationships within the organization increases *geometrically*.[13]

American private sector companies that have remained competitive in the

information age have done so by eschewing the traditional hierarchical staff structure in

favor of a networked C^2 system. The advantages afforded by this restructuring include

the ability to keep pace with increased volumes of real-time information and tighter

decision-cycles.[14] Network-Centric Warfare proposes to garner similar advantages by

sharing information over a common network and using advanced decision support

systems, allowing future commanders to control a larger number of geographically

dispersed, *self-synchronizing* assets. [15] Admittedly, eliminating layers between a given

headquarters and the forces actually performing the mission has shown promise under

very specific circumstances. The Marine Corps' *Hunter Warrior* Advanced Warfighting

Experiment demonstrated that removing middle layers not only improved response time,

but resulted in more efficient employment of ordnance.[16] How—or if—this potential can

be effectively translated into a broader military context remains to be seen, however.

It is difficult to conceive of eliminating layers from the operational level without

creating organizational difficulties. One of the greatest strengths of current U.S. military

practice is the ability to tailor organizational structure to specific circumstances. Joint

doctrine clearly recognizes that organization "directly affects the responsiveness and versatility of joint force operations."[17] This organizational flexibility is particularly important given the need to address a wide-ranging spectrum of potential military activity. For example, a general conflict such as World War II might lead to the establishment of several Theaters of Operations (TOO), whereas a major regional conflict such as the Gulf War might require only one. A specific contingency, or Operation Other Than War (OOTW), might simply result in the creation of a Joint Task Force (JTF).

Network-Centric Warfare advocates' tendency to portray intermediate echelons as information filters overlooks the versatility provided by operational command echelons. Theater commanders, for example, do much more than relay information. Current *National Military Strategy* highlights the importance of remaining globally engaged in order to promote stability throughout various regions. Theater commanders stay abreast of potential regional aggressors, transnational dangers such as ethnic strife, and any unforeseen crises that may emerge. They must ensure that their forces are trained to respond to the full spectrum of crises—whether humanitarian assistance or fighting a major conflict—and accept the likelihood that this will entail entering immature theaters. As if this were not enough, they must also accept the possibility of concurrent operations throughout their AOR.[18]

Based on their continual region-specific assessments, theater commanders develop plans to accommodate JSCP tasking, but more importantly, they identify additional circumstances that may require U.S. force employment. A vital part of this process is developing the peacetime intelligence and logistics assessments that will enable rapid force projection. They use the Joint Operational Planning and Execution

System to lay the groundwork for getting necessary forces and equipment in theater. Theater plans enable each supporting commander to anticipate his own tasking and to develop supporting plans.[19] This process can also be used to identify potential shortfalls that may impact operations. These preparations are essential to dealing with any contingency or major conflict. Often even unexpected crises can be accommodated by using existing plans as a baseline.

Once a TOO is established, the operational commander oversees the integration of several critical theater-wide functions. *Operational C²* is one of these functions, but it pervades each of the others. *Intelligence* must be collected, analyzed, and disseminated for use in operational and campaign planning. This includes identifying the enemy's center of gravity and assessing intangible factors such as the enemy's morale, his level of proficiency, and doctrine. Adequate intelligence is a prerequisite to synchronizing *operational fires*, the employment of combat power to affect the conduct of an operation or campaign. Unlike tactical fires, operational fires occur prior to the beginning of an operation or campaign, often to shape the battlefield or to interdict enemy forces. Operational *logistics* ensures that the theater has the necessary infrastructure to support ongoing and subsequent operations. Finally, *operational protection* employs various indicators and warnings to assess the possibility of attack against military and non-military forces in the theater. The operational commander must develop a theater-wide protection plan against potential threats such as terrorist acts, ballistic missile attacks, and nuclear-biological-chemical weapons.[20]

Eliminating operational echelons completely would effectively shift the burden for training forces, planning for operations, and integrating operational functions to

strategic or tactical level command echelons. Worse yet, these critical functions might be overlooked until it became too late.

Attempts to eliminate layers from *within* the operational level would also be inadvisable. For example, one approach to trimming operational echelons might be to move away from the practice of using JTFs. However, this would be problematic for several reasons. First, becoming fixated on the activity in one portion of his area of responsibility (AOR) might cause the theater combatant commander to lose his regional focus. The Commander in Chief, U.S. Pacific Command's (USCINCPAC) AOR spans approximately 105 million square miles, encompassing nearly 50 percent of the earth's surface. It includes 43 countries, 20 territories and possessions, and 10 U.S. territories. The armed forces of the Peoples Republic of China, Russia, India, North Korea and South Korea all reside within the area.[21] USCINCPAC's decision to employ a system of pre-designated JTF headquarters highlights the importance that he places on the ability to rely on intermediate echelons.[22] This ability to burden share will likely become even more important given the transition from a bipolar to a multipolar security environment.

On-scene command presence is another important factor that reinforces the need to retain operational echelons. The French doctrine of keeping their commanders well behind the battle area was a significant limiting factor in World War II. These rear-area commanders were so removed from operations that by the time they made necessary decisions, the pace of events on the battlefield had overtaken French forces.[23] Today technology might support the practice of controlling operations from afar, but these systems are not infallible. Moreover, advanced systems simply cannot replace the judgement of an experienced operational leader. Whether at the CINC or JTF level, on-

scene commanders keep senior leaders apprised of the local situation. They become familiar with nuances, account for different cultures, and ensure that mindsets do not adversely affect mission accomplishment.

Unity of effort might also suffer if operational echelons were eliminated. History is replete with examples where this occurred because planning was not centralized at the operational level. For example, the lack of a unified plan for the employment of airpower during the Korean and Vietnam Wars led to disjointed use of these assets and minimal coordination with ground forces.[24] Recognition of this problem led to the recent doctrinal decision to centralize employment of air assets under the Joint Forces Air Component Commander (JFACC). Although application of the JFACC concept revealed coordination issues that have yet to be resolved, *Desert Storm* demonstrated the benefits of centrally controlled airpower. The addition of the JFACC to operational level C^2 enables the air component staff to coordinate with the staffs of other assigned components in developing joint operations plans.[25]

While removing operational echelons from the U.S. military command structure might provide Network-Centric Warfare's desired *speed of command*, this would be a fleeting victory if it did so by shifting too much of the burden to the tactical or strategic levels of war. Without an echelon dedicated to maintaining a theater-wide operational perspective, the requisite infrastructure might never materialize, the appropriate forces might not be deployed, and "operations" could devolve into a collection of loosely coordinated events.

COMMAND STYLE

In addition to calling for a move away from the traditional hierarchical command structure, proponents of Network-Centric Warfare have suggested that the current command style will not be adequate for the information age. Citing the increased tempo of warfare, and improved information gathering abilities, they argue for enabling "a well-informed force to organize and self-synchronize complex war activities from the bottom up." [26] Ensuing discussions of how technology can most effectively support decision-making have reopened Pandora's box, casting new light on a chronic doctrinal C^2 issue... the "constantly shifting organizational tension" between centralization and decentralization.[27]

Although this tension has existed for some time, inability to establish a common frame of reference about the meaning of the phrase "command and control" complicates any discussion of the subject.[28] As used here, it refers to a continuous *process*. "Command" covers a wide range of organizational levels from the NCA down to the lowest tactical echelons. In generic terms, it involves receiving and evaluating information from multiple sources, making decisions based upon that information, and sending orders through elements of the "control" system—the organizational structure comprised of the various echelons. The concept of control carries with it both the responsibility and authority to ensure mission accomplishment.[29]

There are advantages and disadvantages associated with employing either command style. A centralized system provides more control over elements within the organization. It is therefore less likely that subordinate leaders will take actions that run counter to—or that complicate—the overarching plan. Heavy emphasis on coordination

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can yield a larger volume of information upon which to base decisions. However, more information does not necessarily translate into a better understanding of what is happening. A highly centralized military C^2 system is vulnerable to decapitation. An adversary can inflict strategic paralysis simply by removing the decision-making authority from the equation. The coalition used this technique to great effect against Iraqi C^2 during the Gulf War. The rigidity of a highly centralized approach also tends to stifle the initiative of lower echelon commanders. Opportunities may be missed while waiting for guidance from higher headquarters. Moreover, commanders who feel encumbered by established control channels may be tempted to supplement or circumvent them by creating informal ones.[30]

A decentralized system is designed to capitalize on the initiative of lower echelons and to prevent overloading the decision-making apparatus. It requires releasing decision-making authority down to subordinates, in spite of the fact that responsibility will continue to reside at a higher level. Discipline is generated from the bottom up. An organization that successfully employs a decentralized style is typically rewarded with the ability to act quickly, but this will likely be at the expense of precision.[31] Subordinate leaders use their judgement to deal with unfolding events in accordance with commander's intent. German use of task-oriented orders (*Ausfragstaktik*) is often cited as an example of what reliance on initiative at lower levels can accomplish.

It is widely held that the introduction of new communications technology can lead to modifications in a military's approach to command. In the U.S. case, the pre-World War II trend toward decentralization has been steadily eroding in favor of centralization. President John F. Kennedy elected to personally supervise the placement of each naval

vessel used in the blockade during the Cuban Missile Crisis.[32] President Lyndon B. Johnson chose the targets that would be bombed in the Vietnam War.[33] More recently, during Operation *Deliberate Force*, Air Force General Michael Ryan consciously chose to become heavily involved in the specific tactical details of the Balkans air operation. Believing that "every bomb was a political bomb," he scrutinized targeting decisions, strike launch times, the composition of attack formations, and route selection.[34] The fielding of the Global Command and Control System (GCCS) has fueled concerns that this trend toward centralization will increase. Anyone in the command structure with access to a GCCS terminal, from the NCA down to the tactical level, can use the system to gain situational awareness of the battlespace.[35] While the potential for rigid centralization is disconcerting, the proposed highly decentralized system advocated by Network-Centric Warfare proponents includes a number of tenets that bear further scrutiny.

First, the belief that advanced systems will enable future forces to lift the fog of war thereby decreasing uncertainty exhibits a faith in technology that is all-too reminiscent of World War II Air Corps Tactical School theorists' claims about the decisiveness of airpower.[36] Furthermore, it neglects a critical difference between commanders at the operational and tactical levels. The tactical commander's focus is on battles and engagements, the "ordered arrangement and maneuver of combat elements in relation to one another and to the enemy to achieve combat objectives directed by the operational commander...tactics is battlefield problem-solving—usually rapid and dynamic in nature."[37] The operational commander's perspective is much broader. The need to plan activity well in advance requires him to make decisions based on

assumptions. Thus, he will routinely have to deal with some degree of uncertainty. This will be compounded by numerous factors outside his control, such as the weather and the will of his opponent.[38] Advanced systems may provide him more information, but this is not the same as intelligence. Incoming data will need to be analyzed and the relative importance of specific pieces assessed. To expect this to occur without error is unrealistic. There will inevitably be uncertainty on the battlefield.

The notion that decision cycles must be tightened in order to succeed in future wars also warrants further examination. The desire to "out think" an adversary by operating inside his Observe-Orient-Decide-Act (OODA) loop is useful as a guiding principle, however its dogmatic application would be counterproductive. Too much emphasis on this principle could lead to the pursuit of speed as an end in itself, rather than as a means to accomplish specific objectives.[39] Speed is only one measure of effectiveness. Accuracy is also important, yet conspicuously absent from discussions about network-based warfare. More significantly, however, the OODA loop is not a useful tool for describing the decision-making process of an operational commander, whose need to plan based on assumptions may not give him the luxury of observing and orienting before he must decide on a course of action. The OODA loop sequence applies more directly to the "battlefield problem-solver," the tactical commander. Network-Centric Warfare's emphasis on tightening decision cycles is an outgrowth of the tendency to lump command echelons together into one nondescript pool in spite of the fact that the processes used at each echelon are really quite different.

Finally, the belief that tactical level commanders will be able to self-synchronize also requires critical examination. Increased access to shared information and improved

situational awareness will no doubt improve their ability to deal with near term occurrences, but this will not necessarily translate into the ability to synchronize tactical actions in order to bring about strategic results. This ability derives from operational design and its resulting concept of operations, commander's intent, phasing, and rules of engagement—all provided by the operational commander. While it is true that tactical commanders can use these to guide their real-time decisions, it is a stretch to expect them to be able to have the theater-wide perspective that will enable them to adjust their activity relative to one another based on evolving political and military considerations. Some form of operational command guidance will be needed. For example, an operational commander who assesses that his forces are about to overrun their logistics base might elect to slow the tempo of operations in order to prevent culmination.

Particularly when contrasted to the increasing tendency toward centralization, Network-Centric Warfare's call for a highly decentralized system is helping to generate an impression that future command style involves choosing between one of the two extremes. U.S. military forces would be better served by retaining the flexible approach afforded by combining elements of centralization and decentralization. Determining the optimal balance will require the experienced judgement of the operational commander. Whenever possible, he should strive to decentralize, thereby preserving his forces' freedom of action. However, in some circumstances, such as peacekeeping missions, a higher degree of centralization will be appropriate. The link between tactical actions and strategic consequences is much more direct in this type of operation, and the potentially negative ramifications of escalation will call for restraint. Although it is understandable for Network-Centric Warfare advocates to want to reverse the trend toward

centralization, this is not an area that will lend itself to black-and-white solutions. Furthermore, reversing the trend toward centralization is not an issue of requiring a new doctrine; it is one of needing to more consistently apply existing doctrine in spite of the fact that technology permits otherwise.

CONCLUSIONS

Opportunity and peril both define each prospective road ahead at this critical juncture. Current efforts to determine how the U.S. military can capitalize on information technology are too uneven and divided. Individual service and joint initiatives will likely provide some answers, but there is a very real danger that viewing the future from differing perspectives will allow important issues to be overlooked. Instead, the search for the "way forward" needs to be approached within a broad context that provides a common frame of reference. This can only be achieved by establishing a recognized forum for open, frank debate. Above all, analysis must be *critical* and *systematic*. Initial efforts will need to focus on defining the parameters of discussion. Fundamental questions such as the relevance of the levels of war to an information age military should thus be identified and resolved. Moreover, although the impetus to realize a technologically based RMA is a strong driving force, technological capability should not be the only engine of change. It may very well be that the organizational adaptation element of this particular RMA proves most vexing.

Placing this in the context of Network-Centric Warfare, determining whether or not the U.S. military should adapt according to business-based models will not be easy, but the potential for increased efficiency makes them well worth considering. However,

the suggestion that operational command echelons can be eliminated is not a viable option. Although it is technologically feasible, the resulting organizational imbalance would make it militarily unsound. Moreover, the belief that a highly decentralized, self-synchronizing force will be able to address the full range of future contingencies does not account for the myriad of other functions performed by operational commanders. Of these, one of the most important is determining what type of command style is most appropriate in a given situation based on political and military circumstances.

Although admittedly intriguing, many of Network-Centric Warfare's key tenets—as they stand today—have been crafted in an idealized world that is devoid of fog, friction and the other complicating factors that characterize warfare. These concepts need to be fleshed out. Enthusiasm over the possibilities of technology may otherwise lead to unintended consequences, such as gravitating back toward the mentality that success at the tactical level is easily translatable into victory. Underestimating—or misunderstanding—the role of operational level commanders will only contribute to this.

RECOMMENDATIONS

The debate regarding how to integrate information technologies needs to occur in the joint arena. Based on its evolving role, U.S. Atlantic Command (USLANTCOM) should establish the forum by engaging joint and service doctrine, professional military education, and warfighting centers in a continual process of conceptual analysis and investigation. One of the first issues to address, head-on, is whether U.S. military forces would benefit by eliminating operational level command echelons simply because

technology will permit it. This analysis suggests they would not, but until there is agreement on this fundamental issue, efforts to plan for the future will remain divided.

> Doctrine centers should define the parameters of the debate by establishing an active *dialogue* to identify and sort out conceptual disagreements. This must not be confined to the doctrine community, however. Discussions with warfighting and professional military education centers will enable doctrine personnel to anticipate—and influence—changes in procedure.

> Identifying potential unintended consequences of networked-based systems, such as allowing the U.S. military C^2 structure to become unbalanced, will require a full understanding of operational art. This includes the purpose of the levels of war and the responsibilities of operational command echelons. Joint and service professional military education centers should provide training to decision-makers and analysts involved in evaluating potential adaptations. Again, cross communication between these centers will be vital to ensuring that perspectives do not become too narrow.

> Debating the relative merits of centralization and decentralization and network-based concepts such as self-synchronization will not be enough, nor will testing them within the separate services. Joint experimentation will be the key to identifying which business-related practices can be translated into the military arena. USLANTCOM should coordinate with joint and service warfighting/simulation centers to develop a joint testing and evaluation schedule that builds toward a large-scale joint experiment.

NOTES

1. Jim Katzaman, "Short Path to the Future," *Air Force News Service*, 13 September 1996, quoted in Ryan Henry and C. Edward Peartree, "Military Theory and Information Warfare," *Parameters*, Autumn 1998, 127.

2. Joint Chiefs of Staff, *Joint Vision 2010* (Washington D.C.: 1995), p. 16; for another discussion on the importance of information to future military operations see Arthur K. Cebrowski, "President's Notes," *Naval War College Review*, Winter 1999, 8-10; for opposing interpretations see Henry and Peartree, 122-123; A.J Bacevich, "Preserving the Well-Bred Horse," *The National Interest*, Fall 1994, 43.

3. Henry & Peartree, p. 130; Gregory A. Roman, "The Command Or Control Dilemma: When Technology and Organizational Orientation Collide," in *Essays on Strategy XIV* ed. Mary A. Sommerville (Washington D.C.: National Defense University Press, 1997), 168.

4. Alvin and Heidi Toffler have popularized the term "information age". See Alvin Toffler, *The Third Wave* (New York: Bantam Books, 1991); Alvin and Heidi Toffler, *War and Anti-War: Survival at the Dawn of the 21st Century* (New York: Warner Books, 1995).

5. Arthur K. Cebrowski and John J. Garstka, "Network-Centric Warfare; Its Origin and Future," U.S. Naval Institute *Proceedings*, January 1998, 33.

6. David Jablonsky, "U.S. Military Doctrine and the Revolution in Military Affairs," *Parameters*, Autumn 1994, 18.

7. Michael Mazarr, et al., *The Military Technical Revolution; A Structural Framework* (Washington: Center for Strategic International Studies, July 1991), 27; Douglas A. MacGregor, "Future Battle: The Merging Levels of War," *Parameters*, Winter 1992-93, 42.

8. David Jablonsky, "Strategy and the Operational Level of War, Part I," *Parameters*, Spring 1987, 65.

9. Headquarters Department of the U.S. Army, *Operations* (Field Manual 100-5) (Washington D.C.: June 14, 1993), 6-0-6-3.

10. Jablonsky, "Strategy Part I," 65.

11. Milan Vego, *On Operational Art: Third Draft*, (Unpublished Manuscript, U.S. Naval War College, Newport, RI: 1998), 14.

12. Jablonsky, "U.S. Military Doctrine," 25.

13. Milan Vego, "Guidance for Task Organization," (Unpublished Research Paper, U.S. Naval War College, Newport, RI: 1998) 17.

14. Cebrowski and Garstka, 29-31; Kenneth E. Todorov, "2010 Staff Organization for Optimum C2: A Private Sector Analysis" (Unpublished Research Paper, U.S. Naval War College, Newport, RI: 1998), 7.

15. Cebrowski and Garstka, 32-33.

16. James R. FitzSimonds, "The Cultural Challenge of Information Technology," *Naval War College Review*, Summer 1998, 14.

17. Joint Chiefs of Staff, *Doctrine for Joint Operations* (Joint Pub 3-0) (Washington D.C.: n.d.), II-10.

18. Joint Chiefs of Staff, *National Military Strategy of the United States of America*, (Washington D.C.: September 1997), 19-21.

19. Ibid, III-1-III-3.

20. U.S. Pacific Command at a Glance," US Pacific Command Homepage, http://www.pacom.mil/about/pacom.htm (26 January 1999).

21. For a more complete discussion of operational functions, see Vego, *On Operational Art*, 175-233.

22. Jay B. Yakely III and Harold E. Bullock, "Training the Pacific Warriors," *Joint Force Quarterly*, Summer 1996, 17.

23. Paul B. Stares, *Command Performance. The Neglected Dimension of European Security* (Washington D.C.: The Brookings Institution, 1981), 47-49.

24. Headquarters U.S. Air Force, *JFACC Primer*, (Washington D.C.: August 1992), 4-5.

25. Marcus Hurley, "JFACC: Taking the Next Step," *Joint Forces Quarterly*, Spring 1995, 60.

26. Cebrowski and Garstka, 32.

27. Jablonsky, "U.S. Military Doctrine," 33.

28. For an excellent discussion of this phenomenon, see Thomas P. Coakley, *Command and Control for War and Peace.* (Washington D.C.: National Defense University Press, 1992), 5.

29. Thomas P. Coakley, *Issues of Command and Control*, (Washington D.C.: National Defense University Press, 1991), xvii-xviii.

30. Coakley, *Issues of Command and Control*, xviii.

31. Vego, *On Operational Art*, 179-180.

32. Martin Van Creveld, *Command in War* (Cambridge: Harvard University Press, 1985), 236-237.

33. Mark Clodfelter "Of Demons, Storms and Thunder: A Preliminary Look at Vietnam's Impact on the Persian Gulf Air Campaign," *Airpower Journal*, Winter 1991, 20.

34. Robert C. Owen, "The Balkans Air Campaign Study: Part 2," *Airpower Journal*, Fall 1997, 9.

35. Larry New, "Command and Control for the Virtual Battlespace," *Air Land Sea Bulletin* 98-2, Aug 1998, 4.

36. David K. Edmonds, "In Search of High Ground: The Airpower Trinity and the Decisive Potential of Airpower," *Airpower Journal*, Spring 1998, 11-12 provides a good overview of airpower theorists' claims.

37. Headquarters Department of the U.S. Army, *Operations*, 6-3.

38. Field Marshall Sir William Slim, "Higher Command In War," *Military Review*, May 1990, 13.

39. Thomas P. Barnett, "The Seven Deadly Sins of Network-Centric Warfare," U.S. Naval Institute *Proceedings*, January 1999, 38.

BIBLIOGRAPHY

Bacevich, A.J. "Preserving the Well-Bred Horse." *The National Interest*, Fall 1994, 43-49.

Barnett, Thomas P. "The Seven Deadly Sins of Network-Centric Warfare." U.S. Naval Institute *Proceedings*, January 1999, 36-44.

Cebrowski, Arthur K. "President's Notes." *Naval War College Review*, Winter 1999, 4-13.

Cebrowski, Arthur K. and John J. Garstka. "Network-Centric Warfare; Its Origin and Its Future." U.S. Naval Institute *Proceedings*, January 1998, 28-35.

Clodfelter, Mark. "Of Demons, Storms and Thunder: A Preliminary Look at Vietnam's Impact of the Persian Gulf Air Campaign." *Airpower Journal*, Winter 1991, 17-32.

Coakley, Thomas P. *Command and Control for War and Peace*. Washington D.C.: National Defense University Press, 1991.

Edmonds, David K. "In Search of High Ground: The Airpower Trinity and the Decisive Potential of Airpower." *Airpower Journal*, Spring 1998, 4-21.

FitzSimonds, James R. "The Cultural Challenge of Information Technology." *Naval War College Review*, Summer 1998, 9-21.

Henry, Ryan and C. Edward Peartree. "Military Theory and Information Warfare." *Parameters*, Autumn 1998, 121-135.

Hurley, Marcus. "JFACC: Taking the Next Step." *Joint Forces Quarterly*, Spring 1995, 60-65.

Jablonsky, David. "Strategy and the Operational Level of War, Part I." *Parameters*, Spring 1997, 65-76.

Jablonsky, David. "U.S. Military Doctrine and the Revolution in Military Affairs." Parameters, Autumn 1994, 18-36.

MacGregor, Douglas A. "Future Battle: The Merging Levels of War." *Parameters*, Winter 1992-93, 33-47.

Mazarr, Michael, et al. *The Military Technical Revolution: A Structural Framework*. Washington: Center for Strategic International Studies, 1991.

New, Larry. "Command and Control for the Virtual Battlespace," *Air Land Sea Bulletin* 98-2, Aug 1998, 4-8.

Owen, Robert C. "The Balkans Air Campaign Study: Part 2," *Airpower Journal*, Fall 1997, 6-26.

Roman, Gregory A. "The Command Or Control Dilemma: When Technology and Organizational Orientation Collide" in *Essays on Strategy XIV*, Edited by Mary A. Sommerville. Washington D.C.: National Defense University Press, 1997.

Slim, Sir William. "Higher Command In War," *Military Review*, May 1990, 10-21.

Stares, Paul B. *Command Performance; The Neglected Dimension of European Security.* Washington D.C.: The Brookings Institution, 1981.

Toffler, Alvin. *The Third Wave.* New York: Bantam Books, 1991.

Toffler, Alvin and Heidi. *War and Anti-War: Survival at the Dawn of the 21st Century.* New York: Warner Books, 1995.

U.S. Department of the Air Force. *JFACC Primer.* Washington D.C.: 1992.

U.S. Department of the Army. *Operations* (Field Manual 100-5) Washington D.C.: 1993.

U.S. Joint Chiefs of Staff. *Doctrine for Joint Operations* (Joint Pub 3-0) Washington D.C.: n.d.

_____. *Joint Vision 2010.* Washington D.C.: n.d.

_____. *National Military Strategy of the United States of America.* Washington D.C. 1997.

"U.S. Pacific Command at a Glance." U.S. Pacific Command Homepage. <http://www.pacom.mil/about/pacom.htm> (26 Jan 1999).

Van Creveld, Martin. *Command in War.* Cambridge: Harvard University Press, 1985.

Vego, *On Operational Art: Third Draft.* Unpublished Manuscript, U.S. Naval War College, Newport, RI: 1998.

Vego, "Guidance for Task Organization." Unpublished Research Paper, U.S. Naval War College, Newport, RI: 1998.

Yakely, Jay B., III. and Harold E. Bullock. "Training the Pacific Warriors," *Joint Force Quarterly*, Summer 1996, 16-21.